2nd INTERNATIONAL EURASIAN CONFERENCE ON MATHEMATICAL SCIENCES AND APPLICATIONS

PROCEEDING BOOK

26-29 AUGUST 2013
SARAJEVO, BOSNIA and HERZEGOVINA

FOREWORD

The 2nd International Eurasian Conference on Mathematical Sciences and Applications has been organized jointly by Sakarya University, Bilecik University, International University of Sarajevo, Kocaeli University and Turkish World Mathematical Society on 26-29 August 2013 in Sarajevo, the city of biggest cultural and economy center of Bosnia Herzegovina.

The first conference on these series was organized in Prishtine, Kosovo on 03-07 September 2012 and 351 scientists were attended the conference from 17 different countries, contributing 248 oral presentations and 36 posters.

The main aim of this conference is to bring mathematical society all over the world working in various areas of theoretical and applicational studies in mathematics. With this conference we have also aimed to promote the Bosnia-Herzegovina and show/announce the reality that the struggle of Aliya Izzetbegovic was right for his country and citizens.

The organizing scheme for the conference was formed by Organizing and Scientific committees. The Scientific committee, who are the best in their research areas, is formed from 17 different countries. 10 worldwide distinguished speakers are invited to the conference. We have taken a lot of applications from 30 countries and this gives us the opportunity to select the best works for the conference. We believe that this has raised the scientific level of the conference.

The first day of the conference is devoted to opening ceremony together with some presentations. The second day will comprise solely the talks. In the third day of the conference the presentation will be held till noon, following by a trip to Sarajevo. In the last day of the conference there will be an excursion to Mostar. Furthermore, in the first and second days' nights there will be Turkish and Bosnian culture nights with dinner.

We would like to thank to Sakarya University, Bilecik University, Kocaeli University and International University of Sarajevo for their invaluable supports. We would also like to thank to all contributors to the conference, especially to the invited speakers who share their scientific knowledge with us, to organizing and scientific committee for their great effort on evaluating the manuscripts. We do believe and hope that each contributor will get benefit from the conference.

We hope to see you in the third International Eurasian Conference on Mathematical Sciences and Applications.

Yours Sincerely,

Prof.Dr. Murat TOSUN

Chairman of the Conference

HONORARY COMMITTEE

Professor Muzaffer ELMAS *(Sakarya University Rector)*

Professor Özer ÇINAR *(International University of Sarajevo Rector)*

Professor Sezer Şener KOMSUOĞLU *(Kocaeli University Rector)*

Professor Azmi ÖZCAN *(Bilecik Seyh Edebali University Rector)*

SCIENTIFIC COMMITTEE

Professor H. Hilmi HACISALİHOĞLU *(Bilecik Şeyh Edebali University)*

Professor Fikret ALIYEV *(Bakü State University)*

Professor İsmail KOCAYUSUFOĞLU *(International University of Sarajevo)*

Professor Nurlan M. TEMIRBEKOV*(Rector, Ust-Kamenogorsk University)*

Professor Harry MILLER *(International University of Sarajevo)*

Professor Ekrem SAVAŞ *(İstanbul Commerce University)*

Professor Ravi P. AGARWAL *(Texas University)*

Professor İrfan ŞİAP *(Yıldız Technical University)*

Professor Muharem AVDISPAHIC (*International University of Sarajevo*)

Professor Halis AYGÜN *(Kocaeli University)*

Professor Senada KALABUSIC (*International University of Sarajevo*)

Professor Mustafa KULENOVİC *(University of Rhode Island)*

Professor Müjgan TEZ *(Marmara University)*

Professor Mirna DZAMONJA *(University of East Anglia)*

Professor Branko CURGUS *(Western Washington University)*

Professor Baki KARLIĞA *(Gazi University)*

Professor Mirjana VUKOVIC *(International University of Sarajevo)*

Professor Mehmet CAN *(International University of Sarajevo)*

Professor Cihan ORHAN (*Ankara University*)

Professor Nargozy DANAEV *(Al-Farabi Kazakh National University)*

Professor Serpil PEHLİVAN (*Süleyman Demirel University*)

Professor Josip PECARIC (*University of Zagreb*)

Professor J. Marshall ASH (*DePaul University*)

Professor Martin BUNTINAS (*Loyola University*)

Professor Jeff CONNOR (*Ohio University*)

Professor Kazım İLARSLAN *(Kırıkkale University)*

Professor Altay BORABAYEV *(Kyrgyz National University)*

Professor Billy E. RHOADES (*Indiana University*)

Professor Varga KALANTAROV (*Koç University*)

Professor Graham BENNETT (*Indiana University*)

Professor H. Hüseyin UĞURLU *(Gazi University)*

Professor Prasanna SAHOO (*University of Louisville*)

Professor Pascal WEIL (*Universite Paris VII*)

Professor Peter DANCHER (*Plovdiv State University*)

Professor A. Aziz ERGÜN *(Akdeniz University)*

Professor Paul HUMKE *(St. Olaf University)*

Professor Michael EVAN (*Washington and Lee University*)

Professor Boris GULAS (*University of Zagreb*)

Professor Levent KULA *(Ahi Evran University)*

Professor Gerasimos LADAS (*University of Rhode Island*)

Professor Neşet AYDIN (Ç*anakkale Onsekiz Mart University*)

Professor Adam J. OSTASZEWSKI (*London School of Economics and Political Science*)

Professor Sait HALICIOĞLU (*Ankara University*)

Professor Nihal YILMAZ ÖZGÜR *(Balikesir University)*

Professor Bayram ŞAHİN *(İnönü University)*

Professor Viorel BARBU (*"Alexandru Ioan Cuza" University*)

Professor Uğur DURSUN *(İstanbul Technical University)*

Professor Vladimir BALAN (*University Politehnica of Bucharest*)

Professor Abdullah ALTIN *(Ankara University)*

Professor Sotiris K. NTOUYAS (*University of Ioannina*)

Professor Mustafa ÇALIŞKAN *(Gazi University)*

Professor Fritz COLONİUS (*University of Augsburg*)

Professor Ömer AKIN *(TOBB University of Economics and Technology)*

Professor Themba DUBE (*University of South Africa*)

Professor Arif SALIMOV *(Atatürk University)*

Professor Vasyl USTIMENKO (*University of Maria Curiwe Sklodowska*)

Professor Emine MISIRLI (*Ege University*)

Professor Norbert HOUNKONNOU (*University of Abomey-Calavi*)

Professor Jawad ABULLAIL *(King Fahd University of Petroleum and Minerals)*

Professor Jerry Lloyd BONA (*University of Illinois at Chicago*)

Professor Enrique ZUAZUA (*Basque Center for Applied Mathematics*)

Professor A. Göksal AĞARĞÜN *(Yıldız Technical University)*

Professor Muhammad Aslam NOOR (*COMSATS Institute of Information Tecnology*)

Professor Wolfgang SPROESSİG (*Technical University of Mining Academy Freiberg*)

Professor Wieslaw PLESNIAK (*Jagiellonian University*)

Professor A. Ceylan ÇÖKEN *(Süleyman Demirel University)*

Professor Constantin UDRISTE (*University Politehnica of Bucharest*)

Professor Marcelo Moreira CAVALCANTI (*State University of Maringa*)

Professor Donal O'REGAN (*National University of Ireland*)

Professor Murat ALTUN *(Uludağ University)*

Professor Wojciech ZAJACZKOWSKI (*Military University of Technology*)

Professor Etibar PANAKHOV *(Fırat University)*

Professor Ali Bülent EKİN *(Ankara University)*

Professor Ali AKHMEDOV *(Bakü State University)*

ORGANIZING COMMITTEE

Professor H. Hilmi HACISALİHOĞLU *(Bilecik Seyh Edebali University)*

Professor Murat TOSUN *(Sakarya University)*

Professor İsmail KOCAYUSUFOĞLU *(International University of Sarajevo)*

Professor Nuri KURUOĞLU *(Bahcesehir University)*

Professor Fikret ALİYEV *(Baku Satate University)*

Professor Halis AYGÜN *(Kocaeli University)*

Professor Mahmut ERGÜT *(Firat University)*

Professor Yusif GASİMOV *(Baku Satate University)*

Professor Yusuf YAYLI *(Ankara University)*

Professor İbrahim OKUR *(Sakarya University)*

Professor Harry MILLER *(International University of Sarajevo)*

Professor Levent KULA *(Ahi Evran University)*

Professor Kazim İLARSLAN *(Kırıkkale University)*

Professor Cengizhan MURATHAN *(Uludağ University)*

Professor Gabit X. MUKHAMEDIYEV

Associate Professor Florim ISUFI *(University of Prishtina)*

Associate Professor Soley ERSOY *(Sakarya University)*

Associate Professor Qendrim GASHI *(University of Prishtina)*

Associate Professor Mehmet Ali GÜNGÖR *(Sakarya University)*

Associate Professor Pepic MEDO *(University of Sarajevo)*

Associate Professor Hatice Gül İNCE İLARSLAN *(Gazi University)*

Associate Professor Huse FATKIC *(International University of Sarajevo)*

Associate Professor Mehmed NURKANOVIC *(University of Tuzla)*

Associate Professor Melek MASAL *(Sakarya University)*

Associate Professor Alica MILLER *(University of Louisville)*

Associate Professor Kamile ŞANLI KULA *(Ahi Evran University)*

Associate Professor Hamid KULOSMAN *(University of Lousville)*

Associate Professor Şevket GÜR *(Sakarya University)*

Assistant Professor Lejla MILLER *(International University of Sarajevo)*

Assistant Professor Murat SARDUVAN *(Sakarya University)*

Assistant Professor Emrah Evren KARA *(Düzce University)*

Assistant Professor Mahmut AKYİĞİT *(Sakarya University)*

Assistant Professor Ergin JABLE *(University of Prishtina)*

Assistant Professor Ercan MASAL *(Sakarya University)*

Assistant Professor Ayşe Zeynep AZAK *(Sakarya University)*

Assistant Professor Mehmet GÜNER *(Sakarya University)*

SECRETARIAT

Professor Murat TOSUN *(Sakarya University)*

Lecturer Muhsin ÇELİK *(Sakarya University)*

Lecturer Selman HIZAL *(Sakarya University)*

Lecturer Doğan ÜNAL *(Sakarya University)*

Research Assistant Hidayet Hüda KÖSAL *(Sakarya University)*

Research Assistant. Tülay SOYFİDAN *(Sakarya University)*

Research Assistant Hatice PARLATICI *(Sakarya University)*

On Matrix Representations of Split Quaternions and Complex Split Quaternions

Melek Erdoğdu[1] and Mustafa Özdemir[2]

Abstract. In this work, we present some important properties of split and complex split quaternions. Firstly, we introduce 4×4 real matrix matrix representations of split quaternions. And we also give 8×8 real matrix representations of complex split quaternions. Moreover, the relations between these representations are stated. Finally, we solve some certain linear split quaternionic equations by using these representations.

Keywords. Split quaternion, Complex split quaternion.

AMS 2010. 11R52, 15A66, 14A06.

References

[1] Akyiğit, M., Kösal, H.H, Tosun M., Split Fibonacci Quaternions, Advances in Applied Clifford Algebras, DOI 10.10007/s00006-013-0401-9, 2013.

[2] Erdoğdu, M., Özdemir, M., On Complex Split Quaternion Matrices, Advances in Applied Clifford Algebras, DOI 10.10007/s00006-013-0399-z, 2013.

[3] Flaut, C., Shpakivskyi, V., Real Matrix Representations for the Complex Quaternions, Advances in Applied Clifford Algebras, DOI 10.10007/s00006-013-0387-3, 2013.

[4] Özdemir, M., The Roots of a Split Quaternion, Applied Mathematics Letters, 22, 258-263, 2009.

[5] Tian, Y., Matrix Representations of Octonions and Their Applications, Advances in Applied Clifford Algebras, 10, 61-90, 2000.

[6] Zhang, F., Quaternions and Matrices of Quaternions, Linear Algebra and its Applications, 251, 21-57, 1997.

[1]Necmettin Erbakan University, Konya, Turkey, merdogdu@konya.edu.tr
[2]Akdeniz University, Antalya, Turkey, mozdemir@akdeniz.edu.tr

On the Eigenvalues and Eigenvectors of a Lorentzian Rotation Matrix Which is Generated by a Timelike Quaternion

Mustafa Özdemir[1] and Melek Erdoğdu[2]

Abstract. In this paper, we find eigenvalues and eigenvectors of a Lorentzian rotation matrix in Minkowski 3 space by using split quaternions. We express the eigenvalues and the eigenvectors of a rotation matrix in terms of the components of the corresponding unit timelike split quaternion. Moreover, we show that the casual characters of rotation axis depend only on first component of the corresponding timelike quaternion..

Keywords. Quaternions, Split Quaternions, Rotation Matrix.

AMS 2010 15A18, 53A35, 51N20.

References

[1] Cockle, J., *On Systems of Algebra Involving More than One imaginary*, Philosophical Magazine. 35 (1849) 434-435.

[2] Kantor, I. L., Solodovnikov, A. S., *Hypercomplex Numbers*, An Elementary Introduction to Algebras. Springer-Verlag, 1989.

[3] Kula, L., Yaylı, Y., *Split Quaternions and Rotations in Semi Euclidean Space* E_2^4, Journal of Korean Mathematical Society. 44 (2007) 1313-1327.

[4] Özdemir, M., Ergin, A.A., *Rotations with unit timelike quaternions in Minkowski 3-space*, Journal of Geometry and Physics. 56 (2006) 322-336.

[5] Özdemir, M., *The Roots of a Split Quaternion*, Applied Mathematics Letters. 22 (2009) 258-263.

[1] Akdeniz University, Antalya, Turkey, mozdemir@akdeniz.edu.tr,
[2] Necmettin Erbakan University, Konya, Turkey, merdogdu@konya.edu.tr.

Bäcklund Transformation for Spacelike Curves in E_1^4

Mustafa Özdemir[1], Melek Erdoğdu[2] and A. Aziz Ergin[3]

Abstract. The main purpose of this paper is to construct a Bäcklund transformation between two spacelike curves with the same constant curvature in Minkowski 4 space by considering some assumptions. Moreover, We give the relations between curvatures of these two spacelike curves..

Keywords. Bäcklund Transformation, Spacelike Curve, Constant Torsion Curve..

AMS 2010 53B30, 53A05, 37K35

References

[1] Abdel-baky, R.A., *The Bäcklund's theorem in Minkowski 3-space R_1^3*. Applied Mathematics and Computation 160 (2005), 41-55.

[2] Aminov, Y., Sym, A., *On Bianchi and Bäcklund transformations of two-dimensional surfaces in E4*. Mathematical Physics, Analysis and Geometry 3 (2000), 75-89.

[3] Nemeth, S.Z., *Bäcklund Transformations of n -dimensional constant torsion curves*., Publicationes Mathematicae 53 (1998), 271-279.

[4] Nemeth, S.Z., Bäcklund transformations of constant torsion curves in 3-dimensional constant curvature spaces. Italian Journal of Pure and Applied Mathematics 7 (2000),125-138.

[5] Özdemir, M., Çöken, A.C., *Bäcklund transformation for non-lightlike curves in Minkowski 3-space*. Chaos, Solitons & Fractals 42 (2009), 2540-2545.

[6] Tian, C., *Bäcklund transformations for surfaces with K = -1 in R^{2,1}*. Journal of Geometry and Physics 22 (1997), 212--218.

[7] Tenenblat, K.,Terng, C.L., *Bäcklund's Theorem for n-Dimensional Submanifolds of R^{2n-1}*. The Annals of Mathematics 111 (1980), 477-490.

[8] Zuo, D., Chen, Q., Cheng, Y., *Bäcklund theorems in three-dimensional de Sitter space and anti-de Sitter space*. J. Geom. Phys. 44 (2002), 279--298.

[1] Akdeniz University, Antalya, Turkey, mozdemir@akdeniz.edu.tr,
[2] Necmettin Erbakan University, Konya, Turkey, merdogdu@konya.edu.tr.
[3] Akdeniz University, Antalya, Turkey, aaergin@akdeniz.edu.tr,